Testimony
by
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UMBC as a National Model: The University as Mentor

My campus colleagues and I see the issue of advancing women and minorities in science and engineering as an issue about which all Americans should be concerned. Consequently, when we were considering the opportunity to apply for a National Science Foundation (NSF) ADVANCE grant, we concluded that I should serve as the Principal Investigator (PI) to emphasize the importance of this initiative to the entire campus and also the importance of men becoming more knowledgeable about the challenges women scientists and engineers face in the academy.

UMBC (the University of Maryland, Baltimore County) is recognized as a national leader in supporting and advancing women and underrepresented minority (URM) students in science, technology, engineering, and mathematics (STEM). We are a public research university, emphasizing graduate programs in the sciences, engineering, and public policy, and building on a strong undergraduate liberal arts and sciences core. We enroll more than 12,000 students (9,500 undergraduate and 2,500 graduate), employ approximately 550 full-time faculty, and receive $85 million in external support annually for research-and-training contracts and grants. We are distinctive because of our demonstrated record of achieving diversity and excellence, particularly in science and engineering. It was especially gratifying when a recent *New York Times* editorial recognized UMBC for *"rocking the house when it comes to the increasingly critical mission of turning American college students into scientists."* [1]

Producing well-prepared scientists and engineers for our increasingly diverse workforce is perhaps our most important and lasting contribution to the nation's economic development and national security. Thousands of Maryland's physicians, scientists, engineers, information technology (IT) workers, policy-makers, and other STEM professionals are among UMBC alumni. The National Security Agency (NSA), for example, employs hundreds of UMBC math and computer science graduates. We rank third nationally (based on NSF data[2]) in the number of computer science and IT degrees awarded and have been designated a Center of Academic Excellence in Information Assurance by the NSA. The campus has twice received the *U.S. Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring*.

UMBC has become a national model for diversity at a time when both the nation is focused intensely on securing and strengthening its position in the global economy, and America's demographic profile is shifting dramatically. Our student body is among the most diverse nationally (40% minority, including 21% Asian, 15% African American, and 4%

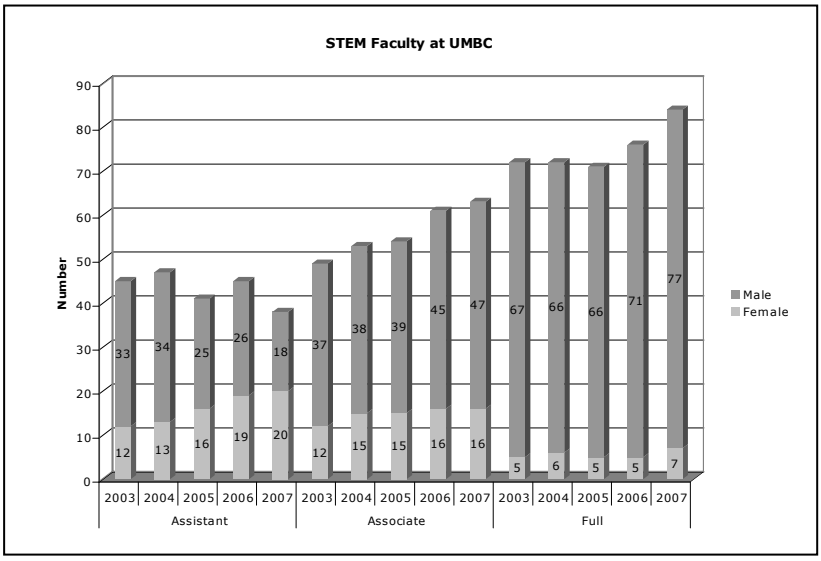
Hispanic and Native American). Particularly noteworthy are data from the American Society of Biochemistry and Molecular Biology (ASBMB) showing that UMBC ranked first nationally in total number of undergraduate biochemistry degrees awarded to African Americans in 2004-2005 (18 degrees). (The ASBMB also ranked UMBC seventh nationally in overall biochemistry degree production, with 63 degrees, and fourth nationally in the total number of biochemistry degrees awarded to Asian Americans, with 23 degrees). Overall, we are recognized as the nation's leading predominantly white university for producing African American undergraduates who go on to earn Ph.D.s in science and engineering.

With the support of our NSF ADVANCE grant, we have used our success in producing minority scientists and engineers, particularly those involving women of color, to develop mentoring initiatives designed to increase the participation of women faculty in STEM fields and to advance them through the faculty ranks and into leadership positions. This comprehensive "university as mentor"[3] approach is designed to embed focused, continuous support of women scientists at all levels – undergraduate and graduate students and faculty throughout the ranks – into the fabric and foundation of the university's culture.

Framing Success for Women Faculty in STEM

The small numbers of women faculty in STEM is a long-standing national problem. A 2005 study shows that women faculty in the top 50 research universities are underrepresented at all ranks, especially as full professors. The study also reveals that underrepresented minority women "are almost non-existent in science and engineering departments at research universities" and are less likely than Caucasian women, or men of any race, to be awarded tenure or reach full professor status.[4] The UMBC ADVANCE Program uses a comprehensive approach based on lessons learned in producing minority scientists to meet these challenges. Our framework includes (1) developing, revising, and institutionalizing policies and practices, and allocating resources, in ways that support the recruitment, hiring, and advancement of women – including particularly minority women – for the faculty at all ranks; (2) engaging the campus broadly in ongoing discussions, informal and formal, that address issues of racial and gender diversity in STEM fields; and (3) establishing a system of targeted mentoring programs designed to create a clear and understandable pathway for STEM women to achieve tenure and promotion, and to transition to academic leadership positions at the university.

Since the inception of the ADVANCE Program at UMBC, the number of female tenure-track faculty has increased 48% from fall 2003 (N=29) to fall 2007 (N=43) compared to a 4% increase in male tenure-track faculty (fall 2003 N=137, fall 2007 N=142). Additionally, with the support offered through ADVANCE, the numbers of STEM women at the assistant



professor and associate professor ranks have increased substantially – assistant professors by 58% (fall 2003 N=12, fall 2006 N=19); associate professors by 33% (fall 2003 N=12, fall 2006 N=16); full professors by 40% (fall 2003 N=5, fall 2007 N=7). These outcomes reflect the university's determination to make progress in this area coupled with constituency education activities and changes in policies and practices that the campus has implemented over the course of the ADVANCE Program at UMBC.

Supporting Minority Achievement in STEM: Applying Lessons Learned to the Structural Components of ADVANCE at UMBC

It is difficult to understand and appreciate fully the challenges that women and minorities face in the sciences and engineering. Until quite recently, American higher education was relatively silent about these challenges – not simply because there was a lack of understanding about the issues, but also because of the discomfort many experienced when discussing issues having to do with gender and race. Today, however, there is growing recognition among leaders in the science community – at NSF and other agencies, for example – of the need to understand these challenges and address them though such initiatives as ADVANCE. Much of the work of our ADVANCE grant is based on our success over the past two decades in producing minority scientists and engineers though our Meyerhoff Scholars Program. What we have learned about institutional transformation – including culture change, the need for mentoring, and the importance of creating a strong sense of community – has made it possible for us to have the conversations necessary to address these challenges. These conversations have engaged faculty, students, and campus leaders, and have been instrumental in building trust, creating community, and focusing on the facts about the serious underrepresentation of women in STEM.

Preparing and Educating the Campus at All Levels

One successful strategy for developing a culture of inclusion for women faculty has been a campuswide *Distinguished Speaker Series*, spotlighting the contributions of top women research scientists and focusing on issues that women faculty in STEM face in the academy. Modeling success, especially the achievements of top minority women scientists, provides a compelling demonstration of diversity and excellence for the entire campus. The distinguished speakers also give a special seminar on their research at the departmental level to highlight targeted impact on the field.

We have worked to engage all levels of campus administration and each STEM department in developing and implementing ADVANCE initiatives. *Chairs and Deans Meetings* are held at least once a semester to focus on progress and challenges. These meetings provide a regular forum for education and debate about best practices and highlight departmental success in creating supportive work climates for women. Outside experts regularly present current research to the Chairs and Deans on gender issues in science and engineering, with special attention to the particular experiences of minority women faculty. Chairs also raise issues based on their own efforts to affect departmental climate change and advance women and minority faculty in their departments. The STEM departments are further involved with ADVANCE through *Faculty Liaisons*, an initiative that includes nine and female faculty members, one from each STEM department, who serve as advocates for the ADVANCE program within their departments. In addition, *individual meetings* among each Chair and the ADVANCE Director

and Lead Co-PI focus on providing targeted information for the department and identifying ways the program could most effectively support their faculty. Finally, through its *ADVANCE Excellence Awards*, the program regularly recognizes the contributions of individuals (including administrators and Chairs) to the success of women in STEM.

Recruiting and Supporting Minority Women in STEM

UMBC is committed to creating an environment of support and success that is attractive to the nation's top prospective women and minority faculty in STEM. Accordingly, the Provost requires all departments planning to conduct a faculty search to submit a written *Faculty Diversity Recruitment Plan* for attracting a broad and diverse pool of applicants. This requirement is coupled with annual training on diversity recruitment presented by the Provost, Lead Co-PI, Director of Human Relations, and Senior Associate Dean of the Graduate School. Additional guidance is provided to departments by their respective Dean. Special attention is given to strategies and techniques for attracting applications from women and minority candidates and demonstrating a culture of inclusion to all candidates who visit campus. All female candidates for STEM faculty positions meet with faculty from *WISE* (our chapter of Women In Science and Engineering) and with representatives of the ADVANCE Program to make them aware of the resources and support available at UMBC. All male and female candidates meet with the Vice Provost for Faculty Affairs, who discusses support for balancing work and family issues, including information about *UMBC's Family Support Policy* and *flexible tenure timelines* for family and medical leave. In addition, the campus leadership (including the President, in his role as ADVANCE PI) is available to candidates to discuss these issues. The *ADVANCE Research Assistantships for Chairs* help STEM departments in successfully recruiting new women STEM faculty by offering one-year research assistantships which are added to the recruitment packages for these candidates.

Mentoring Minority Women for Success in STEM

Demonstrating a clear and successful path to promotion and tenure is central to the work of our ADVANCE Program. The *Faculty Horizons Program* was created with support from ADVANCE to help participants become successful faculty members in STEM, with particular attention focused on attracting women from underrepresented groups. This initiative builds on lessons learned through the undergraduate and graduate Meyerhoff bridge program experience, and our *Graduate Horizons Program*.

This intensive two-and-a-half-day workshop focuses on mentoring. The program targets senior-level graduate students and post-doctoral fellows, particularly women interested in becoming tenured STEM faculty. The workshop has been held annually since 2003 and has attracted 252 participants, including 237 women, 118 of whom have been underrepresented

minority. Our *Faculty Horizons Program* receives more than 250 applications for each of its annual workshops and has been duplicated at Virginia Tech and Rice University.

The *Eminent Scholar Program* facilitates mentoring relationships between all new female STEM faculty and prominent researchers in their fields. This relationship is tailored to meet the specific needs of the junior scholar based on how effectively she has been mentored up to that point. ADVANCE also works closely with the *WISE* group on campus, an informal university network of STEM women, including a number of women of color, which meets monthly to provide a *community of exchange and support*. Before the ADVANCE initiative, the *WISE* group initiated an informal exchange of mentoring information through its monthly meetings. ADVANCE has expanded to develop this informal mentoring activity into a formal *Faculty ADVANCEment Workshop Series*, providing monthly workshops for all STEM faculty members on topics related to the tenure process, grant writing, resource negotiations, departmental politics, press relations, work/family issues, effective communication, and lab management.

Through ADVANCE, we also have learned a great deal about some of the special challenges women in STEM fields face, particularly minority women, because of the numerous campus and community demands that are made on their time. Maintaining a productive research agenda is one such challenge, and to avoid attrition of minority women from doctoral programs and academic positions, institutions need to be supportive of these promising scholars and help to protect their research agendas as they move toward either completing their doctorates or achieving promotion and tenure. In this connection, the *ADVANCE Research Assistantship Program for Current Faculty* provides competitively awarded funding for a research assistant (RA) to female and male faculty who actively support the advancement of women and minorities in STEM fields. These RA awards are intended to support associate professors who are close to promotion, compensate for high service loads, and serve as bridge money for faculty between grants. Further support is available through the ADVANCE *Faculty Sponsorship Committee*, consisting of senior men and women faculty, which identifies and advises STEM women as they approach important milestones in their academic careers. The Committee offers guidance to STEM women about dossier preparation, balancing research and service obligations, and developing effective teaching portfolios as they anticipate third-year review or tenure with promotion. Together, these activities create a web of support that helps to guide women on a clearly defined path to success.

"Not Going It Alone"

"My soul was hungry for support." These are the words that Dr. Kristi Pullen, a brilliant young African American women and former Meyerhoff Scholar, wrote to me two years ago as she contemplated her future after earning her Ph.D. in biochemistry at one of the nation's leading research universities. She had performed superbly in her doctoral program, solving protein structures using x-ray crystallography. But Dr. Pullen seriously considered leaving science for policy work in response to the profound sense of isolation she had experienced during her graduate studies. At this critical point in her career, reflecting on what "going it alone" had meant to her, Dr. Pullen concluded, *"I had all but completely given up on the idea of going into bench science [and] didn't particularly want to engage in it any longer. I have found this road to be a particularly lonely one, and I couldn't see myself walking it anymore."* Fortunately, Kristi has remained in science, in part because of the support and encouragement she received from my colleagues.

Moving forward, though, it's important to ask ourselves how can we create a culture of inclusion and a community of support to encourage talented minority women like Kristi Pullen to thrive as scientists and engineers in our universities? A university's institutional culture reflects its values, and inclusive academic cultures promote the advancement of women in STEM fields by identifying and addressing institutional barriers to success wherever they exist, and by cultivating a community of support. A culture of inclusion provides visible leadership and attends to climate and attitudes in all sectors of the campus – engaging faculty, administrators, staff, and students. A community of support listens carefully to the voices of women scientists, including women of color, and maintains a climate of openness that encourages the expression of wide-ranging views without concern of censure. Inclusion, in this sense, captures more than just a sense of possibility. Inclusion encourages an environment of high expectation and support, provides clear pathways to advancement, establishes best practices in mentoring, develops viable networks and communities of shared interests, prepares women to contribute to society as top researchers, and, in so doing, strengthens the experience for all faculty.

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[1] Stapes, Brent, "Why American College Student Hate Science," *The New York Times*, May 25, 2006.

[2] National Science Foundation, WebCASPAR Integrated Science and Engineering Resources Data System.

[3] Bass, S., Rutledge, J.C., Douglass, E.R., Carter, W.Y., "The University as Mentor: Lessons Learned from UMBC Inclusiveness Initiatives," Council of Graduate Schools, 2007.

[4] Nelson, D.J., Rogers, D.C., "A National Analysis of Diversity in Science and Engineering Faculties at Research Universities," National Science Foundation, January, 2005.